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(56) Documents Cited  
GB 2118865 A GB 2029271 A GB 1587952 A

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(54) An electrostatic system for powder coating

(57) An electrostatic system for powder coating products is described comprising a container (1) for the powder, a pump unit (2) for pumping powder from the container (1) to an electrostatic powder gun (6) under the control of a powder gun control unit (8). A hose rinsing pulsation control (9) is connected via a venturi (3) to a hose (5) leading to the powder gun (6) to purge any build-up of powder in the venturi (3), hose (5) or powder gun (6). The system is particularly applicable to the flavouring of foodstuffs such as snacks by coating them with a powder flavouring or seasoning.

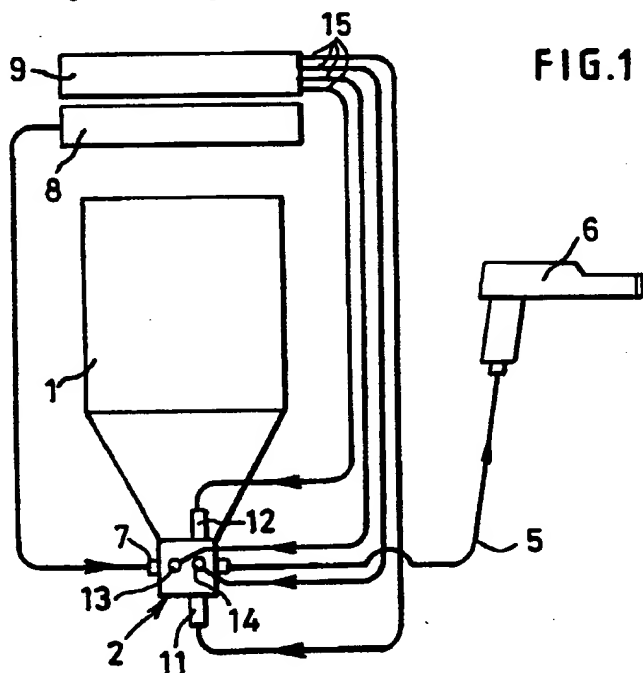


FIG.1

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FIG.1

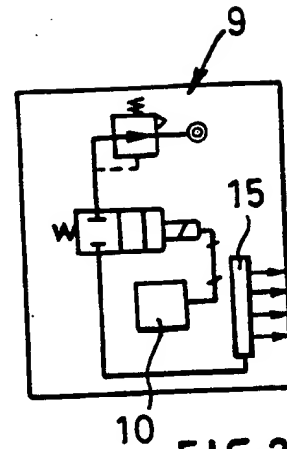
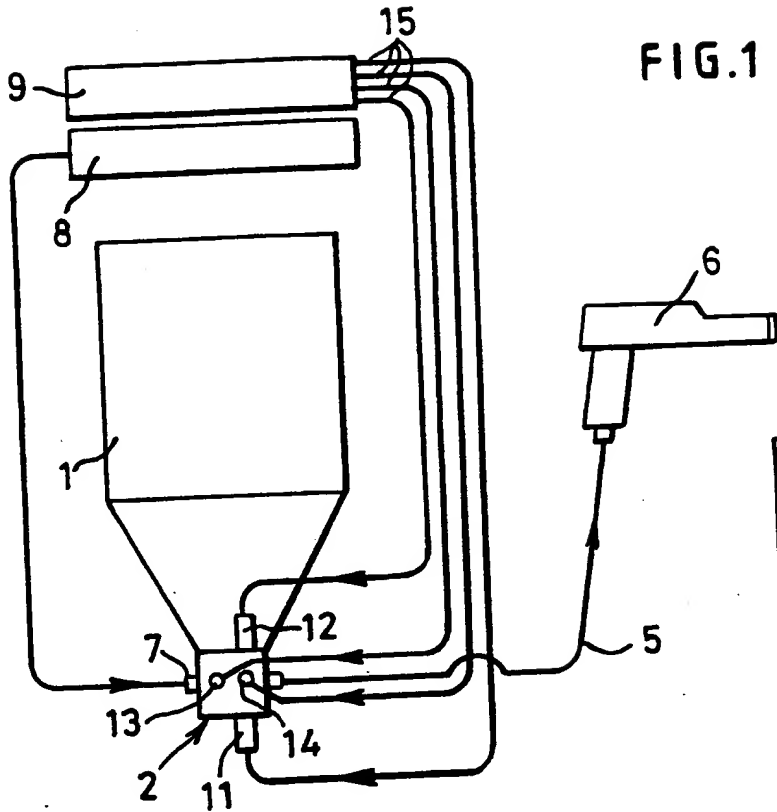


FIG.2

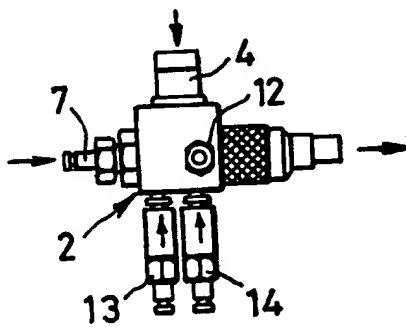


FIG.3

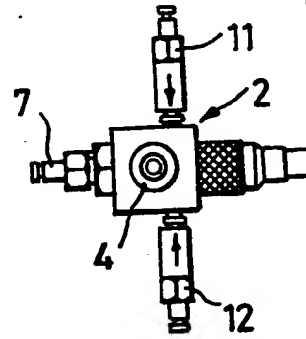


FIG.4

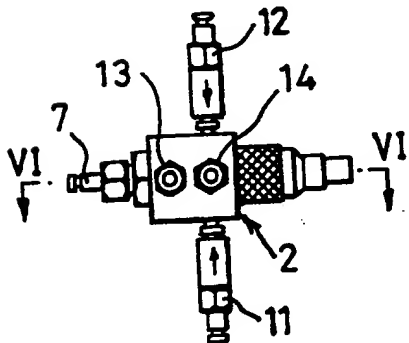


FIG.5

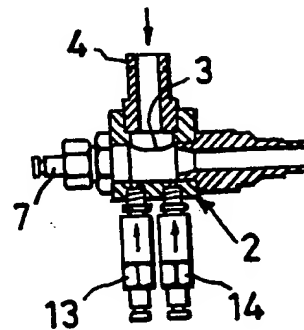


FIG.6

AN ELECTROSTATIC SYSTEM

This invention relates to an electrostatic system for powder coating products and more particularly to the flavouring of foodstuffs such as snacks by coating them  
5 with a powder flavouring or seasoning.

A number of electrostatic apparatuses are known for coating food products such as snacks with a powdered flavouring. One such apparatus comprises an electrostatic gun having a charge head located adjacent  
10 an outlet for an airborne flow of powdered flavouring to a chamber containing a food product. The food product has an electric charge opposite to that of the powdered flavouring, so that the powdered flavouring is attracted to and evenly deposited on the food product.

15 The powdered flavouring may contain dispersed oil or it may be formed of animal fats such as cheese, which has the disadvantage that the powder containing the oil or fat may build-up in the system tubes and the electrostatic gun, with the result that the agglomeration  
20 of powder may become dislodged and adhere to the food snack in lumps resulting in an unpleasant concentration of flavour powder on the food snack and an adverse customer reaction. To prevent this, the system requires regular cleaning and maintenance, particularly when a  
25 different powdered flavouring is required to coat the food snack.

An aim of the present invention is to provide an electrostatic system which overcomes the above disadvantage.

30 According to the present invention there is provided an electrostatic system for powder coating products comprising a container for the powder; a pump unit for pumping powder from the container to an electrostatic powder gun under the control of a powder  
35 gun control unit, wherein a hose rinsing control is connected via the pump unit to a hose leading to the

powder gun to purge any build-up of powder in the pump unit, hose or powder gun.

Conveniently the pump unit includes a venturi to pump airborne powder from the container.

- 5        Preferably, the hose rinsing control includes a timer which can be set to pulse gas blasts through the hose and powder gun according to a preset timing sequence.

In a preferred construction the container is a  
10 hopper with the pump unit mounted at the funnel outlet of the hopper.

An embodiment of the electrostatic system for powder coating products will now be described, by way of example only, with reference to the accompanying  
15 drawings, in which:

Fig. 1 is a diagrammatic view of the electrostatic system, according to the invention;

Fig. 2 is a diagrammatic view of a hose rinsing control;

- 20        Fig. 3 is a side elevation of a powder pump unit;

Fig. 4 is a plan view of the pump unit shown in Fig. 3;

Fig. 5 is an underneath plan of the pump unit shown in Figs. 3 and 4; and

- 25        Fig. 6 is a cross-section taken along the line VI-VI of Fig. 5.

The electrostatic system illustrated comprises a container for the powdered coating material in the form of a hopper 1. A pump unit 2 is located at the hopper  
30 outlet and includes a venturi 3 as shown in Fig. 6. The venturi acts to pump airborne powder entering the inlet 4 to a hose 5 connected at one end to the pump unit 2 and at its other end to an electrostatic gun 6. A gas supply, normally air, enters the pump 2 at 7 and  
35 transports the flow of airborne powder to the gun 6.

The operation of the powder gun is under the

control of a "powder gun control unit" 8 having controls to preset the desired powder quantity by means of the conveying air pressure indicated on a gauge. The stability of the powder feed is indicated on a conveying  
5 air flowmeter. Using a supplementary air supply the ideal feed rate can be set even for low powder output.

The electronic controls for the powder gun can be set to produce a consistently high negative charge of up to 98 kV.

10       The purging of any powder build-up in the venturi 3 and pump unit 2, the hose 5 or the gun 6 is carried out using a hose-rinsing control unit 9, a detail of which is shown in Fig. 2. The unit is electronically controlled by a preset timer 10 to supply bursts of air at  
15 predetermined intervals for a timed duration to the inlets 11 and 12 and to purge inlets 13 and 14 from a bank of four air control lines 15.

The hose-rinsing control unit 9 is programmed to operate in a sequence selected for a predetermined powder  
20 size and depending on the temperature and humidity of the ambient air.

The timed program is critical to maintain a free flow of the powdered flavouring without build-up of the powder in narrow bores, or at hose connections where  
25 internal shoulders may be present. The program is also determined by the content of oil or animal fats in the powdered flavouring.

The purge cycle is also used to cleanse the pump unit, the hose and electrostatic gun when a fresh powder  
30 is to be used. The timer is set for the desired periods to expel any residual powder remaining in the airflow system.

A conventional electrostatic powder gun is used, either individually or in a bank of two or more, to  
35 provide an even coating of flavouring to food products such as potato chips, corn chips, potato products,

cereals and the like. The snacks are fed to a rotating drum in which the snacks are tumbled and the gun or guns are directed into the drum to discharge a flow of airborne negatively-charged powder into the drum. The 5 positively charged snacks attract the powder to form an evenly distributed coating over the snacks.

Because of the purging of the airflow in the passage from the powder pump unit 2 along the hoses 5 to each powder gun 6, a continuous powder flow is maintained 10 preventing any agglomerations of powdered particles building up along the flow path, e.g. at hose connections.

The control units 7 and 8 include control panels which can be readily set with manual control knobs and 15 visual indicators to the predetermined settings for the food product to be coated. Such settings take into account the ambient temperature and humidity, which critically affect the quality and taste of the final product.

## CLAIMS:

1. An electrostatic system for powder coating products comprising a container for the powder, a pump unit for pumping powder from the container to an electrostatic powder gun under the control of a powder gun control unit, wherein a hose rinsing control is connected via the pump unit to a hose leading to the powder gun to purge any build-up of powder in the pump unit, hose or powder gun.
- 10 2. An electrostatic system as claimed in Claim 1, wherein the pump unit includes a venturi to pump airborne powder from the container.
3. An electrostatic system as claimed in Claim 1 or 2, wherein the hose rinsing control includes a timer which  
15 can be set to pulse gas blasts through the hose and powder gun according to a preset timing sequence.
4. An electrostatic system as claimed in any preceding claim, wherein the container is a hopper.
5. An electrostatic system as claimed in Claim 6,  
20 wherein the pump unit is mounted at the funnel outlet of the hopper.
6. An electrostatic system as claimed in any preceding claim, in which the pump unit is connected to a plurality of powder guns.
- 25 7. An electrostatic system as claimed in any preceding claim, wherein the hose rinsing control and the powder gun control unit have manual and visual controls to enable the control units to be preset.
8. An electrostatic system as claimed in any preceding  
30 claim, wherein the powder gun produces a consistently high negative charge of up to 98 kV.
9. An electrostatic system as claimed in any preceding claim, wherein the powder gun control unit has a supplementary air supply to control the feed rate of the  
35 air flow to the pump unit.
10. An electrostatic system substantially as

hereinbefore described with reference to and as shown in the accompanying drawings.

11. Each and every novel feature or novel combination of features herein disclosed.



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Amendments to the claims have been filed as follows

1. An electrostatic system for powder coating products comprising a container for the powder, a pump unit for pumping powder from the container to an electrostatic powder gun under the control of a powder gun control unit wherein a hose rinsing pulsation control is connected via a venturi to a hose leading to the powder gun to purge any build-up of powder in the venturi, hose or powder gun.
2. An electrostatic system as claimed in Claim 1, wherein the hose rinsing control includes a timer which can be set to pulse gas blasts through the hose and powder gun according to a preset timing sequence.
3. An electrostatic system as claimed in Claim 1 or 2, wherein the container is a hopper.
4. An electrostatic system as claimed in Claim 3, wherein the pump unit is mounted at the funnel outlet of the hopper.
5. An electrostatic system as claimed in any preceding claim, in which the pump unit is connected to a plurality of powder guns.
6. An electrostatic system as claimed in any preceding claim, wherein the hose rinsing control and the powder gun control unit have manual and visual controls to enable the control units to be preset.
7. An electrostatic system as claimed in any preceding claim, wherein the powder gun produces a consistently high negative charge of up to 98 kV.
8. An electrostatic system as claimed in any preceding claim, wherein the powder gun control unit has a supplementary air supply to control the feed rate of the air flow to the pump unit.
9. An electrostatic system substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

**Patents Act 1977****Examiner's report to the Comptroller under  
Section 17 (The Search Report)**

Application number

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**Relevant Technical fields**

(i) UK Cl (Edition L) B2F FGB  
B2L LCDE

(ii) Int Cl (Edition 5) B05B

**Search Examiner**

M ELLIOTT

**Databases (see over)**

(i) UK Patent Office

(ii)

**Date of Search**

24 JUNE 1993

Documents considered relevant following a search in respect of claims

1-10

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 2118865 A (ELECTROPAINT LTD) - whole document	1 at least
X	GB 2029271 A (ON O DA CEMENT CO LTD) - whole document	1 at least
X	GB 1587952 (PPG) - whole document	1 at least

Category	Identity of document and relevant passages - 9 -	Relevant to claim(s)

#### Categories of documents

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